4/02

TIMSS-R Analysis Summary
Idaho
Mathematics

Introduction

In 1999, the Third International Mathematics and Science Study (TIMSS) was replicated at the eighth grade. Involving 41 countries and testing at five grade levels, TIMSS was originally conducted in 1995 to provide a base from which policy makers, curriculum specialists, and researchers could better understand the performance of their educational systems. Conducted under the auspices of the International Association for the Evaluation of Educational Achievement (IEA), TIMSS was the first step in a long-term strategy, with further assessments in mathematics and science planned for 1999, 2003, and beyond.

Five content areas were covered in the TIMSS 1999 mathematics test: fractions and number sense; measurement; data representation, analysis, and probability; geometry; and algebra. About one-fourth of the questions were in the free-response format, requiring students to generate and write their answers. The achievement data are accompanied by extensive questionnaire data about the home, classroom, school, and national contexts within which mathematics learning takes place. Because a valid and efficient sample in each country is crucial to the quality and integrity of the study, TIMSS developed procedures and standards regarding coverage of the target population, participation, and the age and years of schooling of students. TIMSS 1999 was conducted with rigorous attention to attaining high quality in all aspects of the project.

Idaho Analysis

The Third International Math and Science Study for 1999 was completed by 1,844 Idaho students (909 girls and 935 boys). Participants were all in the 8^{th} grade with an average age of 14.2 years. The average score in mathematics for Idaho students is 495. There are 38 countries participated in this international study along with 13 states and 14 individual school districts or consortia. The test scores are reported on a scale of 0 to 800 points. In-depth surveys of the students, parents, teachers, and administrators are also included in the TIMSS 1999 study.

The most recent data analyses involved conducting ANOVA and ad hoc t-tests on math achievement scores, the 5 math content areas, and two items in the Student Questionnaire. The two items are “How often does this happen in your mathematics lessons? (26a to 26t)” and “When we begin a new topic in mathematics, we begin by …(27a to 27f)”.

Highlights from the analysis:

- The following items have a significant ANOVA test on the overall math achievement score and the 5 math content areas.

26a) The teacher shows us how to do mathematics problems.
26d) We work on mathematics projects.
26e) We work from worksheets or textbooks on our own.
26i) We work together in pairs or small groups.
26k) We can begin our homework in class.
26s) The teacher gets interrupted by messages, visitors, etc.
26t) The teacher uses a computer to demonstrate ideas in mathematics.
27f) Trying to solve an example related to the new topic.

- The following items **DON'T** have a significant ANOVA test on the overall math achievement score and the 5 math content areas.

26b) We copy notes from the board.
26c) We have a quiz or test.
26l) The teacher checks homework.
26m) We check each other's homework.
26q) Students use the board.

- Students usually scored lowest on Geometry. Measurement is the second lowest among the 5 math content areas.

- Measurement is the only math content area that has a significant ANOVA test on item *"We use calculators"(26f).*

- Geometry is the only math content area that has a significant ANOVA test on item *"We discuss our completed homework."(26n)*

- Geometry is the only math content area that has a NOT significant ANOVA test on item *"We use computers."(26g)*

- Geometry is the only math content area that has a NOT significant ANOVA test on item *"The teacher uses the board."(26o)*

- Geometry is the only math content area that has a NOT significant ANOVA test on item *"The teacher uses an overhead projector."(26p)*

- Geometry is the only math content area that has a NOT significant ANOVA test on item *"Students use an overhead projector."(26r)*

- Geometry is the only math content area that has a NOT significant ANOVA test on item *"Having the teacher explain the rules and definitions."(27a)*

- Geometry is the only math content area that has a NOT significant ANOVA test on item *"Having the teacher ask us what we know related to the new topic."(27d)*

- Fractions and number sense is the only math content area that has a significant ANOVA test on item *"We use things from everyday life in solving mathematics problems."(26h)*

- Across countries, the vast majority of students (80 percent) reported never using computers in mathematics class. The trend data from 1995 to 1999, however, show a small but statistically significant shift from the "never" to the "once in while" category. Although there was great variation across countries, about a quarter of the students inter-nationally reported Internet access at school. Despite this access, only 10 percent on average used the Internet to obtain information for mathematics projects on even a monthly basis. In Idaho, the percentage answered "Never" to item 26g "*How often do you use computer in mathematics class?*" and item 26t "*How often does the teacher use a computer to demonstrate ideas in your math lesson?*" are 76 percent and 78 percent respectively. These figures are consistent with the national trend.

Next Steps

The next step should include developing different regression models in order to predict math achievement scores in Idaho. The t-test analysis may be interesting, but it is only the first step to explore the data. Regression models can help us to understand the relationship between the math achievement scores and predictors (such as math confidence, teaching method, and school resources) simultaneously. It is also important to obtain the teacher's file (in AM software) format from Eugenio. It is the teacher file, which contains the most interesting variables for our data analyses.